How the Vissim Model Works

Corridor Cities Transitway

Vissim is a software package used to create computer simulations of traffic conditions on a roadway network. Vissim is a microsimulation tool, meaning that it models individual vehicles in the traffic stream, considering the actions of virtual "drivers" in response to other vehicles, the road network and various traffic controls. The resulting simulations are used by traffic engineers to understand existing traffic conditions and to estimate the impact of proposed changes on future traffic conditions. Vissim also allows the creation of animations (i.e. AVI files) that allow visualization of the model results by decision makers, stakeholders and the public.

STEPS TAKEN IN A VISSIM ANALYSIS

A Vissim analysis typically involves the following steps:

1. Define the study area, proposed improvements and the future year for analysis.

2. Develop a model of existing conditions, using existing traffic counts, knowledge of roadway geometry and existing traffic controls (advisory signs, speed limits, and signal timings).

3. Calibrate the "Existing Conditions" model to make sure that simulated traffic conditions accurately reflect real world traffic conditions.

4. Develop a "Future No-Build" model using projections of future traffic volumes and knowledge of planned improvements that have previously been approved for construction.

5. Develop a "Future Build" model which incorporates proposed improvements related to the project. These models may be compared against "No Build" models to gauge the effect of proposed improvements on future traffic conditions.

6. Develop reports and visualizations of simulated traffic conditions from the outputs of Vissim models. These results may guide decisions to modify the project or consider new alternatives.

7. Incorporate revisions to the design in the "Future Build" model and repeat. This cycle of simulating proposed improvements and tweaking the design results in an improved project that best meets the needs of the traveling public.

CRITERIA USED TO CREATE THE VISSIM MODELS FOR THE CCT PROJECT

The Vissim models include the area surrounding the CCT between Metropolitan Grove and Shady Grove. This study area includes roads running closely parallel to or crossing the CCT, in addition to all side street and driveway intersections (including private and commercial entrances) along these routes.

The year 2010 serves as a baseline for "Existing" conditions evaluation. All current "Future" conditions models are based on traffic projections for the year 2035.

Vissim simulations for all scenarios (Existing, Future No-Build, and multiple Build scenarios) have all been evaluated for weekday AM and PM peak hour traffic conditions.

Inputs used to develop the "Existing" conditions Vissim model include:

- **Traffic counts** - AM and PM peak-hour traffic counts were collected in the field or from official sources, including the Maryland State Highway Administration (SHA).

- **Roadway network** - The existing road network was virtually "rebuilt" in the Vissim model by importing aerial photography and redrawing required roadway links on top of it. The number of lanes, lane widths, curves, turn lanes, etc. were all input as measured from the aerial photography and then field-verified.

- **Traffic controls** - Current speed limits, stop signs, and traffic signals are coded into the model. Traffic signal timings were obtained from the Montgomery County Department of Transportation (MCDOT).

- **Sidewalks and crosswalks** - Pedestrian volumes are entered from traffic counts and the sidewalk geometry is coded in just like the roads. Pedestrian crossings at signals are controlled with pedestrian phases coded into the model with the rest of the signal timing information.

- **Transit routes** - The models include existing bus routes and schedules for WMATA Metrobus, Montgomery County Ride On, and local services such as the King Farm Shuttle.

FUTURE TRAFFIC PROJECTIONS

Projections for future traffic are developed from forecast models developed by the Metropolitan Washington Council of Governments (MWCOG) that account for projected changes in land use, population, and major projects documented in the fiscally constrained long range transportation plan (http://www.mwcog.org/clrp/).

No major road improvements are authorized for funding in the County's long range plans, and so the future road network mostly matches the existing. One exception is to new private developments such as Crown Farm, in which case developer plans are used to include future roadways in the model.

 "Future build" condition models include special roadway links representing the CCT guideway. New traffic signals and modifications to existing traffic signals have been added where the CCT crosses existing roadways at-grade. The signal timing is adjusted to manage the CCT crossings with a minimum impact to street traffic. The models are then run to find out how traffic flows and how the CCT operates on its programmed schedule.
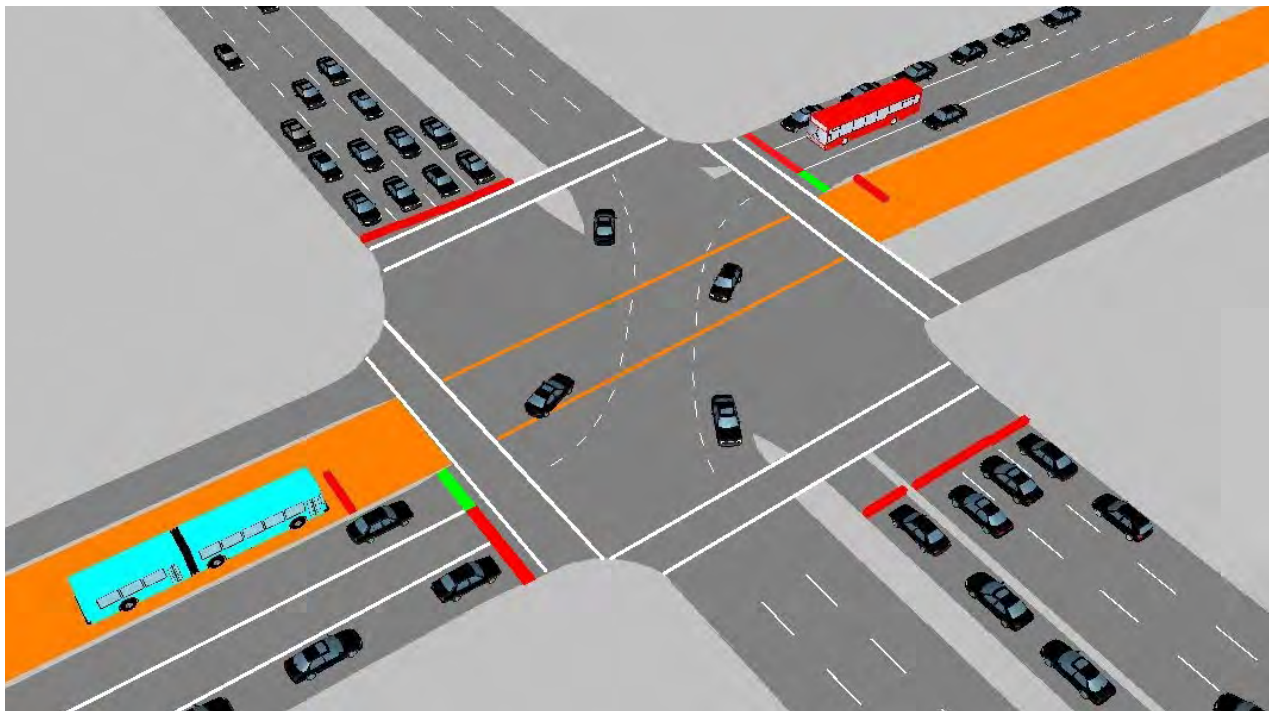
Example of Vissim animation showing a CCT median guideway crossing an intersection

For more information on the Corridor Cities Transitway, please visit our website: **www.mta.maryland.gov/cct**

Maryland Department of Transportation

MARYLAND
Smart, Green & Growing

MTA *Maryland*